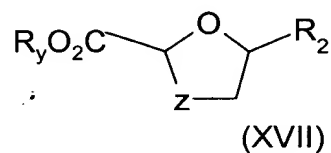


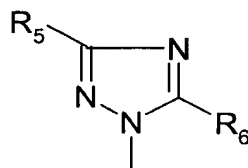
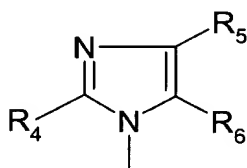
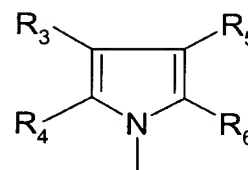
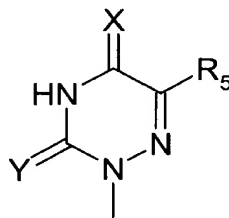
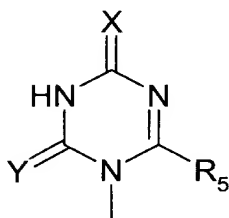
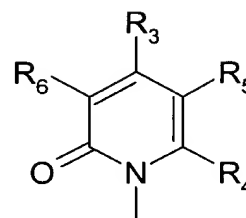
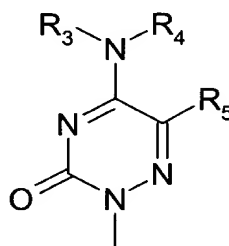
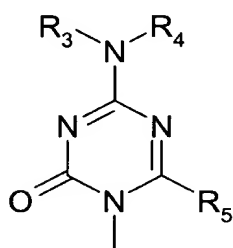
reacting the compound of formula (XVI) with a silylated  $R_2$ - compound, in the presence of a Lewis acid, whereby said leaving group is displaced, to produce a compound of formula (XVII):

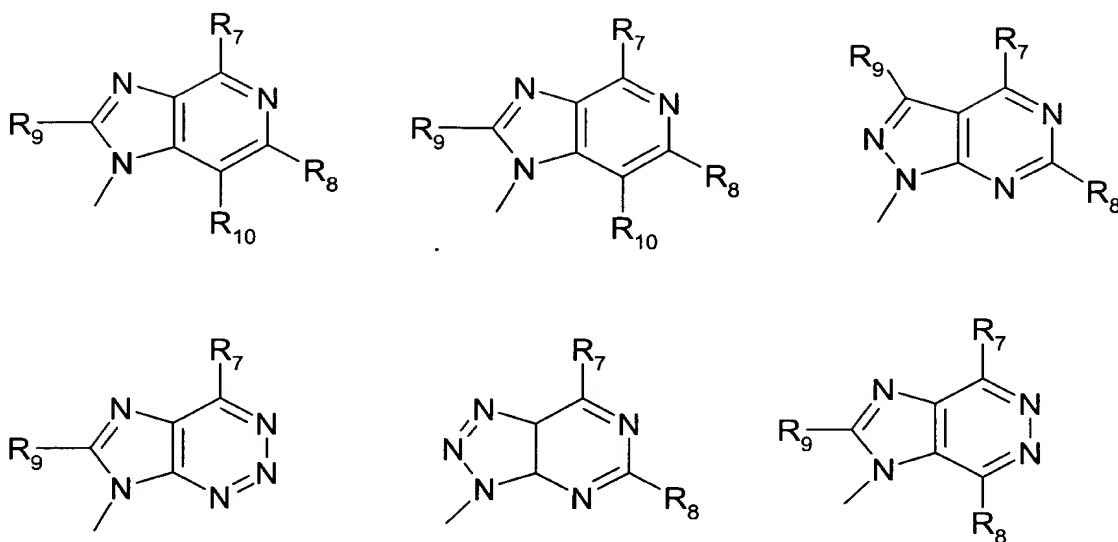


wherein

Z is S;

$R_2$  is selected from the following group:





X is oxygen or sulfur;

Y is oxygen or sulfur;

R<sub>3</sub> and R<sub>4</sub> are independently selected from hydrogen, hydroxyl, amino, C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, and C<sub>1-10</sub> acyl or aracyl;

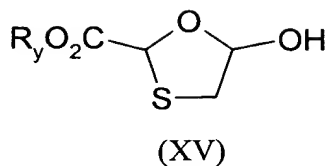
R<sub>5</sub> and R<sub>6</sub> are independently selected hydrogen, halogen, hydroxyl, amino, cyano, carboxy, carbamoyl, alkoxy carbonyl, hydroxymethyl, trifluoromethyl, thioaryl, C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, and C<sub>1-10</sub> acyloxy;

R<sub>7</sub> and R<sub>8</sub> are independently selected from hydrogen, hydroxy, alkoxy, thiol, thioalkyl, amino, halogen, cyano, carboxy, alkoxy carbonyl, carbamoyl, C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, and C<sub>1-10</sub> acyloxy; and

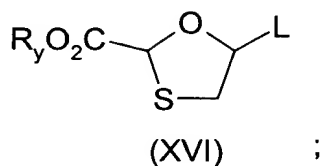
R<sub>9</sub> and R<sub>10</sub> are independently selected from the hydrogen, hydroxy, alkoxy, amino, halogen, azido, C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, and C<sub>1-10</sub> acyloxy.

**36.** A process comprising:

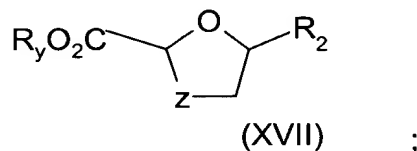
reacting a mercaptoacetaldehyde with a compound of formula R<sub>y</sub>OOCCHO, wherein R<sub>y</sub> is C<sub>1-12</sub> alkyl or C<sub>6-20</sub> aryl to obtain a compound of formula (XV)



converting the hydroxyl group of the compound of formula (XV) to a leaving group L to obtain a compound of formula (XVI):



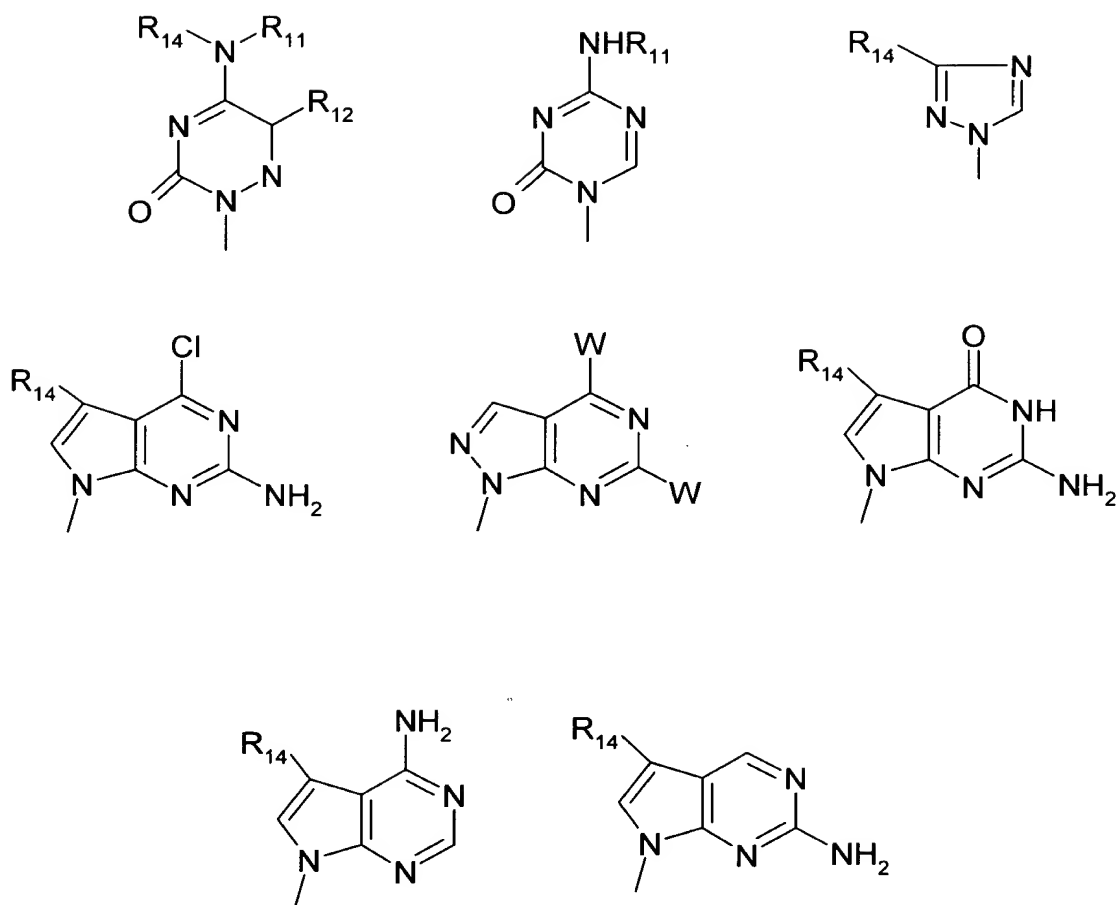
reacting the compound of formula (XVI) with a silylated  $\text{R}_2$ - compound , in the presence of a Lewis acid, whereby said leaving group is displaced, to produce a compound of formula (XVII):



wherein

Z is S;

$\text{R}_2$  is selected from the following group:



wherein

each  $R_{11}$  is independently selected from hydrogen, acetyl, and  $C_{1-6}$  alkyl;

$R_{12}$  and  $R_{13}$  are independently selected from hydrogen, hydroxymethyl, trifluoromethyl,  $C_{1-6}$  alkyl,  $C_{1-6}$  alkenyl, bromine, chlorine, fluorine, and iodine;

$R_{14}$  is selected from hydrogen, cyano, carboxy, ethoxycarbonyl, carbamoyl, and thiocarbamoyl; and

each  $W$  is independently selected from hydrogen, bromine, chlorine, fluorine, iodine, amino, and hydroxyl.

37. A process according to claim 35, wherein  $L$  is  $OR_z$ , wherein  $R_z$  is selected from:  $C_{1-6}$  alkyl groups,  $C_{1-6}$  aliphatic groups, aromatic acyl groups, saturated or unsaturated alkoxycarbonyl groups, sulfonyl imidazolide, carbonyl imidazolide, aliphatic or aromatic

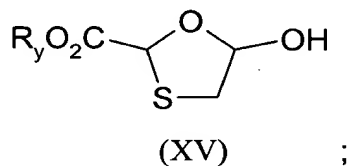
amino carbonyl groups, alkyl imidate groups, saturated or unsaturated phosphinoyl, and aliphatic or aromatic sulphonyl groups.

01 38. A process according to claim 36, wherein L is OR<sub>z</sub>, wherein R<sub>z</sub> is selected from: C<sub>1-6</sub> alkyl groups, C<sub>1-6</sub> aliphatic groups, aromatic acyl groups, saturated or unsaturated alkoxy carbonyl groups, sulphonyl imidazolidine, carbonyl imidazolidine, aliphatic or aromatic amino carbonyl groups, alkyl imidate groups, saturated or unsaturated phosphinoyl, and aliphatic or aromatic sulphonyl groups.

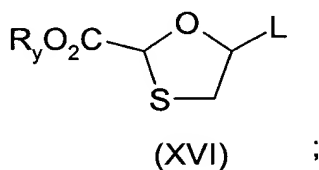
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45. A process comprising:

reacting a mercaptoacetaldehyde with a compound of formula R<sub>y</sub>OOCCHO, wherein R<sub>y</sub> is C<sub>1-12</sub> alkyl or C<sub>6-20</sub> aryl to obtain a compound of formula (XV)

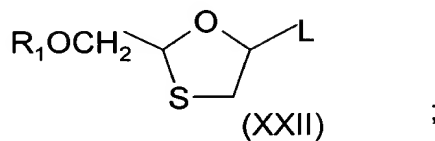


converting the hydroxyl of the compound of formula (XV) to a leaving group L to obtain a compound of formula (XVI):



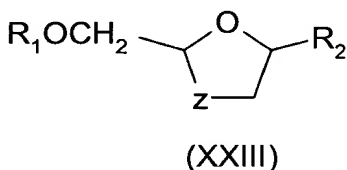
converting the group R<sub>y</sub>O<sub>2</sub>C of the compound of formula (XVI) to a hydroxymethyl group;

protecting the resulting hydroxymethyl with a protecting function  $R_1$  to obtain a compound of formula (XXII):



wherein  $R_1$  is selected from the group consisting of  $C_{1-16}$  acyl, t-butyldimethylsilyl, and t-butyldiphenylsilyl;

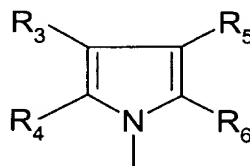
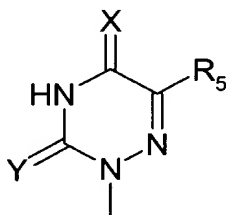
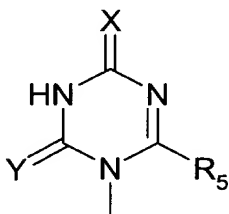
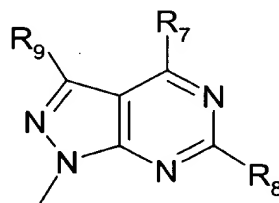
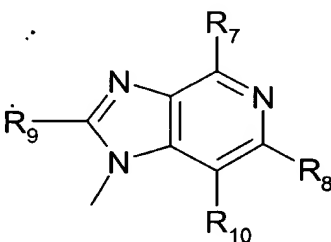
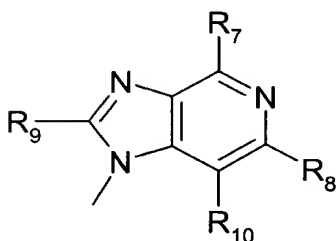
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reacting the compound of formula (XXII) with a silylated- $R_2$  compound, in the presence of a Lewis acid, whereby said leaving group is displaced, to obtain a compound of formula (XXIII):

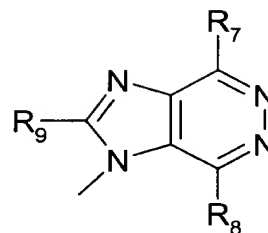
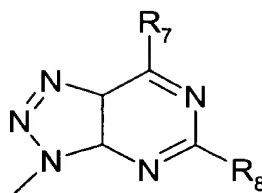
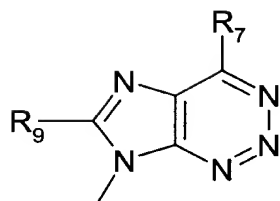
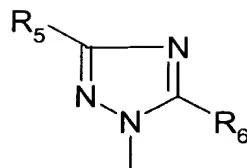
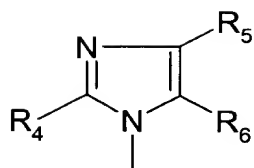


wherein

$Z$  is S;

$R_2$  is selected from the following group:





02

X is oxygen or sulfur;

Y is oxygen or sulfur;

R<sub>3</sub> and R<sub>4</sub> are independently selected from hydrogen, hydroxyl, amino, C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, and C<sub>1-10</sub> acyl or aracyl;

R<sub>5</sub> and R<sub>6</sub> are independently selected hydrogen, halogen, hydroxyl, amino, cyano, carboxy, carbamoyl, alkoxy carbonyl, hydroxymethyl, trifluoromethyl, thioaryl, C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, and C<sub>1-10</sub> acyloxy;

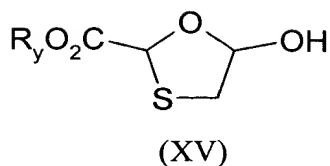
R<sub>7</sub> and R<sub>8</sub> are independently selected from hydrogen, hydroxy, alkoxy, thiol, thioalkyl, amino, halogen, cyano, carboxy, alkoxy carbonyl, carbamoyl, C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, and C<sub>1-10</sub> acyloxy; and

R<sub>9</sub> and R<sub>10</sub> are independently selected from the hydrogen, hydroxy, alkoxy, amino, halogen, azido, C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, and C<sub>1-10</sub> acyloxy; and

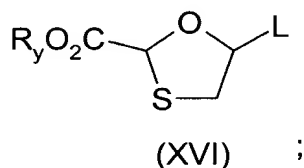
optionally further comprising oxidizing Z of said compound of formula (XXIII) to obtain a compound of formula (XXIII) wherein Z is S=O or SO<sub>2</sub>.

#### 46. A process comprising:

reacting a mercaptoacetaldehyde with a compound of formula R<sub>y</sub>OOCCHO, wherein R<sub>y</sub> is C<sub>1-12</sub> alkyl or C<sub>6-20</sub> aryl to obtain a compound of formula (XV)

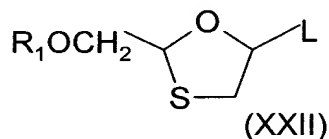


converting the hydroxyl of the compound of formula (XV) to a leaving group L to obtain a compound of formula (XVI):



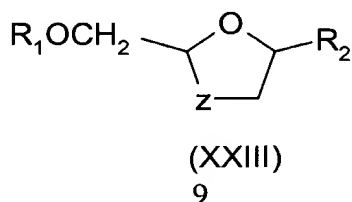
converting the group  $\text{R}_y\text{O}_2\text{C}$  of the compound of formula (XVI) to a hydroxymethyl group;

protecting the resulting hydroxymethyl with a protecting function  $\text{R}_1$  to obtain a compound of formula (XXII):



wherein  $\text{R}_1$  is selected from the group consisting of  $\text{C}_{1-16}$  acyl, t-butyldimethylsilyl, and t-butyldiphenylsilyl;

reacting the compound of formula (XXII) with a silylated- $\text{R}_2$  compound, in the presence of a Lewis acid, whereby said leaving group is displaced, to obtain a compound of formula (XXIII):

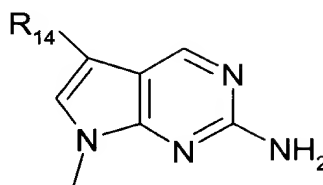
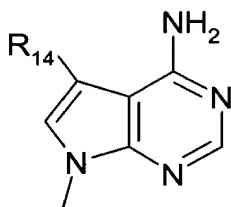
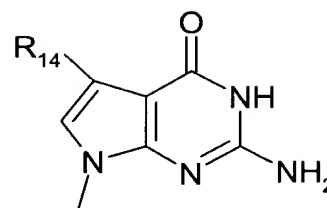
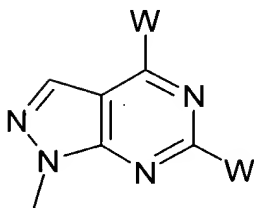
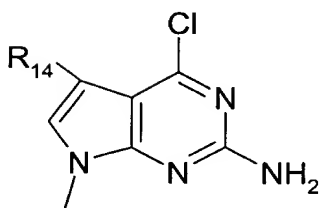
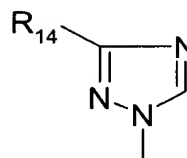
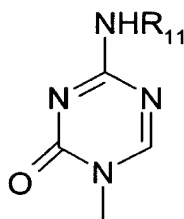
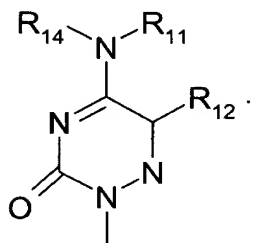




wherein

Z is S;

R<sub>2</sub> is selected from the following group:



wherein

each R<sub>11</sub> is independently selected from hydrogen, acetyl, and C<sub>1-6</sub> alkyl;

R<sub>12</sub> and R<sub>13</sub> are independently selected from hydrogen, hydroxymethyl, trifluoromethyl, C<sub>1-6</sub> alkyl, C<sub>1-6</sub> alkenyl, bromine, chlorine, fluorine, and iodine;

R<sub>14</sub> is selected from hydrogen, cyano, carboxy, ethoxycarbonyl, carbamoyl, and thiocarbamoyl; and

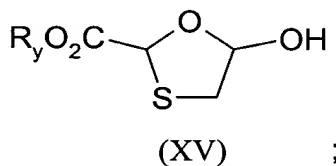
each W is independently selected from hydrogen, bromine, chlorine, fluorine, iodine, amino, and hydroxyl; and

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optionally further comprising oxidizing Z of said compound of formula (XXIII) to obtain a compound of formula (XXIII) wherein Z is S=O or SO<sub>2</sub>.

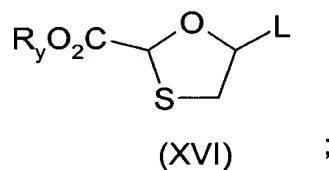
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55. A process comprising:

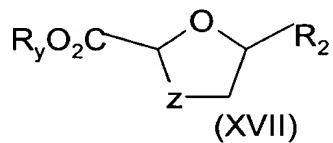
reacting a mercaptoacetaldehyde with a compound of formula R<sub>y</sub>OOCCHO, wherein R<sub>y</sub> is C<sub>1-12</sub> alkyl or C<sub>6-20</sub> aryl to obtain a compound of formula (XV)



converting the hydroxyl of the compound of formula (XV) to a leaving group L to obtain a compound of formula (XVI):



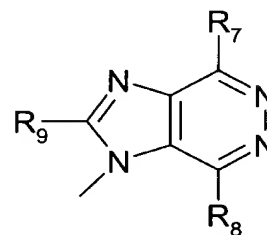
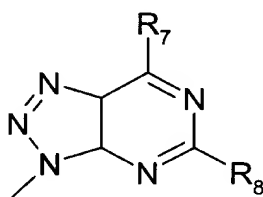
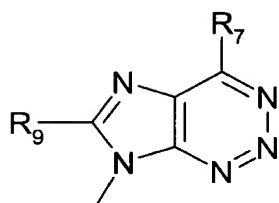
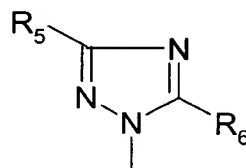
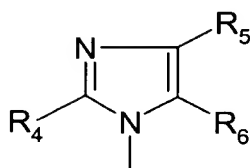
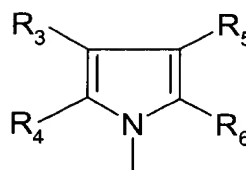
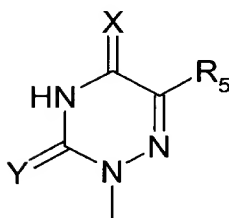
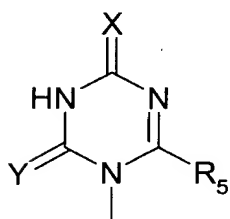
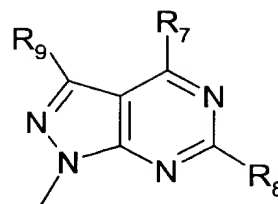
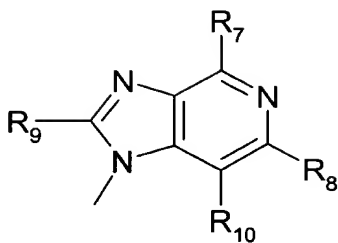
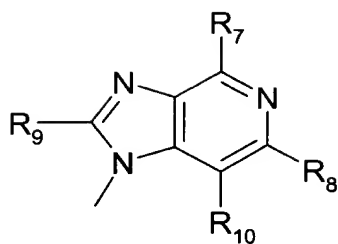
reacting the compound of formula (XVI) with a silylated -R<sub>2</sub> compound in the presence of a Lewis acid, whereby said leaving group is displaced, to produce a compound of formula (XVII):



wherein

Z is S;

R<sub>2</sub> is selected from the following group:



X is oxygen or sulfur;

Y is oxygen or sulfur;

R<sub>3</sub> and R<sub>4</sub> are independently selected from hydrogen, hydroxyl, amino, C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, and C<sub>1-10</sub> acyl or aracyl;

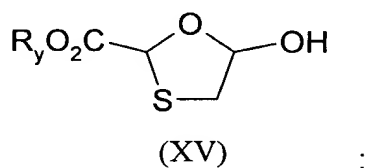
$R_5$  and  $R_6$  are independently selected hydrogen, halogen, hydroxyl, amino, cyano, carboxy, carbamoyl, alkoxycarbonyl, hydroxymethyl, trifluoromethyl, thioaryl,  $C_{1-6}$  alkyl,  $C_{2-6}$  alkenyl,  $C_{2-6}$  alkynyl, and  $C_{1-10}$  acyloxy;

$R_7$  and  $R_8$  are independently selected from hydrogen, hydroxy, alkoxy, thiol, thioalkyl, amino, halogen, cyano, carboxy, alkoxycarbonyl, carbamoyl,  $C_{1-6}$  alkyl,  $C_{2-6}$  alkenyl,  $C_{2-6}$  alkynyl, and  $C_{1-10}$  acyloxy; and

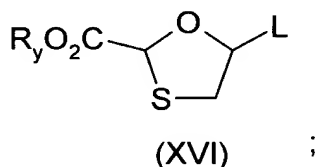
$R_9$  and  $R_{10}$  are independently selected from the hydrogen, hydroxy, alkoxy, amino, halogen, azido,  $C_{1-6}$  alkyl,  $C_{2-6}$  alkenyl,  $C_{2-6}$  alkynyl, and  $C_{1-10}$  acyloxy.

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56. A process comprising:

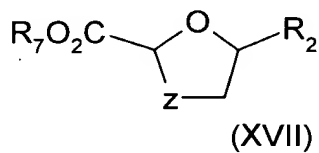
reacting a mercaptoacetaldehyde with a compound of formula  $R_yOOCCHO$ , wherein  $R_y$  is  $C_{1-12}$  alkyl or  $C_{6-20}$  aryl to obtain a compound of formula (XV)



converting the hydroxyl of the compound of formula (XV) to a leaving group L to obtain a compound of formula (XVI):



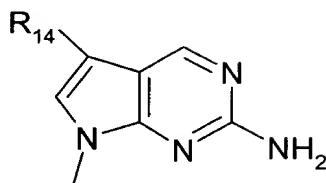
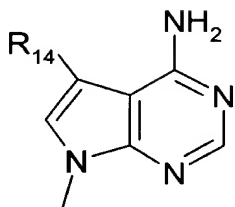
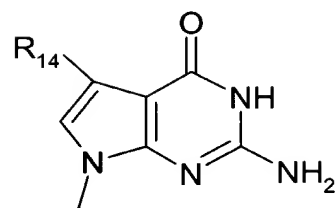
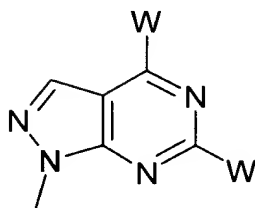
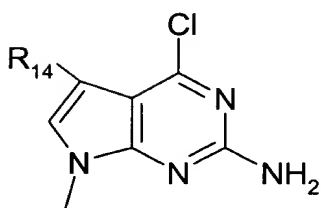
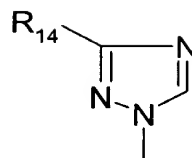
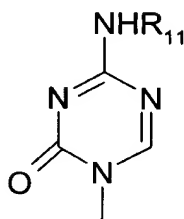
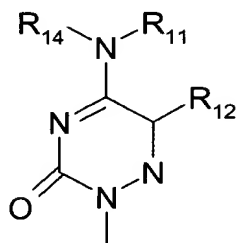
reacting the compound of formula (XVI) with a silylated  $-R_2$  compound in the presence of a Lewis acid, whereby said leaving group is displaced, to produce a compound of formula (XVII):



wherein

Z is S;

R<sub>2</sub> is selected from the following group:



each R<sub>11</sub> is independently selected from hydrogen, acetyl, and C<sub>1-6</sub> alkyl;

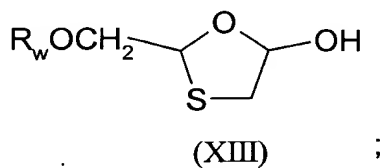
R<sub>12</sub> and R<sub>13</sub> are independently selected from hydrogen, hydroxymethyl, trifluoromethyl, C<sub>1-6</sub> alkyl, C<sub>1-6</sub> alkenyl, bromine, chlorine, fluorine, and iodine;

R<sub>14</sub> is selected from hydrogen, cyano, carboxy, ethoxycarbonyl, carbamoyl, and thiocarbamoyl; and

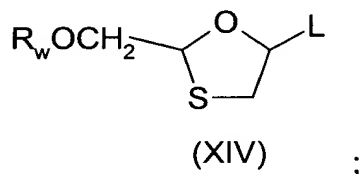
each W is independently selected from hydrogen, bromine, chlorine, fluorine, iodine, amino, and hydroxyl.

63. A process comprising:

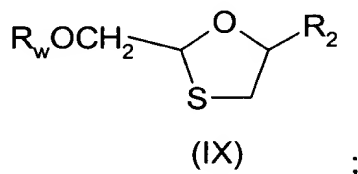
reacting a mercaptoacetaldehyde with a compound of formula  $R_wOCH_2CHO$ , under neutral or basic conditions, wherein  $R_w$  is hydrogen or a hydroxyl protecting group to obtain a compound of formula (XIII)



converting the hydroxyl of the compound of formula (XIII) to a leaving group L to obtain a compound of formula (XIV):



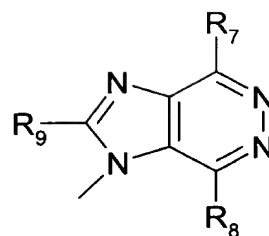
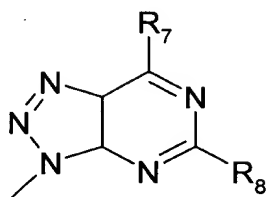
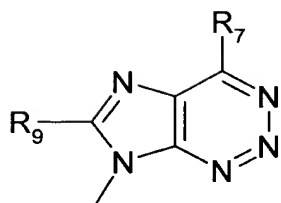
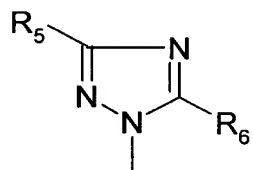
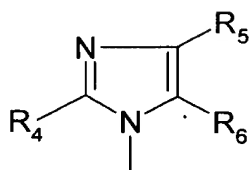
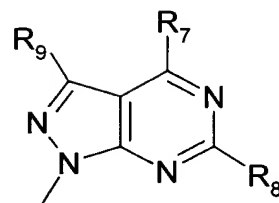
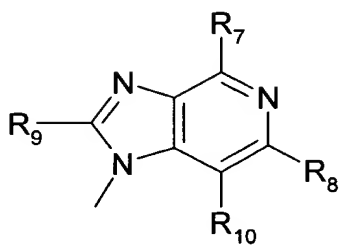
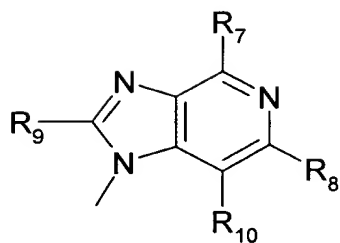
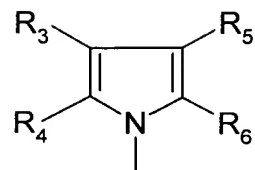
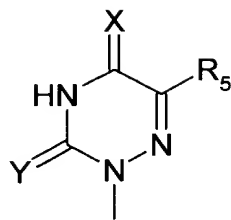
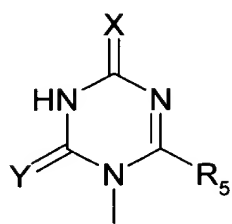
reacting the compound of formula (XIV) with a silylated purine or pyrimidine base or derivative thereof  $R_2$ , in the presence of a Lewis acid, said leaving group is displaced, to produce a compound of formula (IX):



wherein

Z is S, and

R<sub>2</sub> is selected from the following group:



D4

X is oxygen or sulfur; Y is oxygen or sulfur;

R<sub>3</sub> and R<sub>4</sub> are independently selected from the group consisting of hydrogen, hydroxyl, amino, substituted or unsubstituted C<sub>1-6</sub> alkyl or C<sub>2-6</sub> alkenyl or C<sub>2-6</sub> alkynyl, and substituted or unsubstituted C<sub>1-10</sub> acyl or aracyl;

R<sub>5</sub> and R<sub>6</sub> are independently selected from the group consisting of hydrogen, halogen, hydroxyl, amino, cyano, carboxy, carbamoyl, alkoxycarbonyl, hydroxymethyl, trifluoromethyl, thioaryl, substituted or unsubstituted C<sub>1-6</sub> alkyl or C<sub>2-6</sub> alkenyl or C<sub>2-6</sub> alkynyl, and substituted or unsubstituted C<sub>1-10</sub> acyloxy;

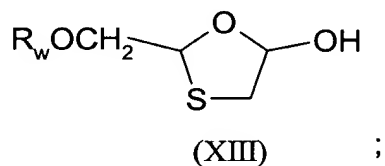
04  
R<sub>7</sub> and R<sub>8</sub> are independently selected from the group consisting of hydrogen, hydroxy, alkoxy, thiol, thioalkyl, amino, substituted amino, halogen, cyano, carboxy, alkoxycarbonyl, carbamoyl, substituted or unsubstituted C<sub>1-6</sub> alkyl, or C<sub>2-6</sub> alkenyl, or C<sub>2-6</sub> alkynyl, and substituted or unsubstituted C<sub>1-10</sub> acyloxy; and

R<sub>9</sub> and R<sub>10</sub> are independently selected from the group consisting of hydrogen, hydroxy, alkoxy, amino, substituted amino, halogen, azido, substituted or unsubstituted C<sub>1-6</sub> alkyl or C<sub>2-6</sub> alkenyl or C<sub>2-6</sub> alkynyl, and substituted or unsubstituted C<sub>1-10</sub> acyloxy+ and

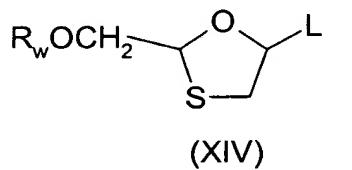
optionally further comprising oxidizing Z of said compound of formula (IX) to obtain a compound of formula (IX) wherein Z is S=O or SO<sub>2</sub>.

**64. A process comprising:**

reacting a mercaptoacetaldehyde with a compound of formula R<sub>w</sub>OCH<sub>2</sub>CHO, under neutral or basic conditions, wherein R<sub>w</sub> is hydrogen or a hydroxyl protecting group to obtain a compound of formula (XIII)

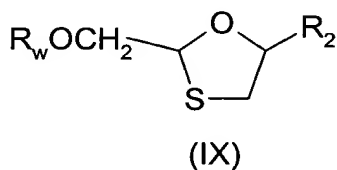


converting the hydroxyl of the compound of formula (XIII) to a leaving group L to obtain a compound of formula (XIV):





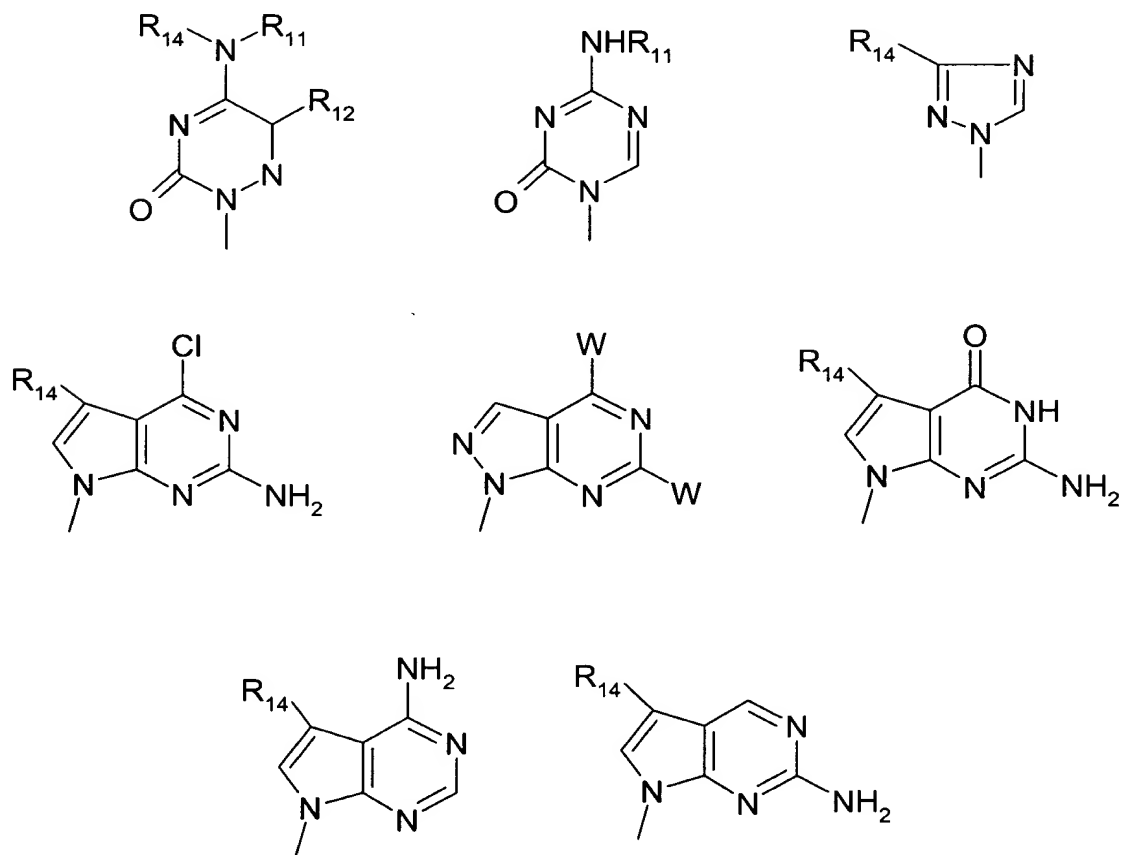
reacting the compound of formula (XIV) with a silylated purine or pyrimidine base or derivative thereof  $R_2$ , in the presence of a Lewis acid, said leaving group is displaced, to produce a compound of formula (IX):



wherein

Z is S, and

$R_2$  is selected from the following group:



each  $R_{11}$  is independently selected from hydrogen, acetyl, and  $C_{1-6}$  alkyl;

$R_{12}$  and  $R_{13}$  are independently selected from hydrogen, hydroxymethyl, trifluoromethyl,  $C_{1-6}$  alkyl,  $C_{1-6}$  alkenyl, bromine, chlorine, fluorine, and iodine;

$R_{14}$  is selected from hydrogen, cyano, carboxy, ethoxycarbonyl, carbamoyl, and thiocarbamoyl; and

each  $W$  is independently selected from hydrogen, bromine, chlorine, fluorine, iodine, amino, and hydroxyl.

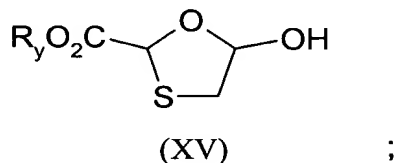
04  
65. A process according to claim 63, wherein  $L$  is  $OR_z$ , wherein  $R_z$  is selected from:  $C_{1-6}$  alkyl groups,  $C_{1-6}$  aliphatic groups, aromatic acyl groups, saturated or unsaturated alkoxy carbonyl groups, sulphonyl imidazolide, carbonyl imidazolide, aliphatic or aromatic amino carbonyl groups, alkyl imidate groups, saturated or unsaturated phosphinoyl, and aliphatic or aromatic sulphonyl groups.

66. A process according to claim 64, wherein  $L$  is  $OR_z$ , wherein  $R_z$  is selected from:  $C_{1-6}$  alkyl groups,  $C_{1-6}$  aliphatic groups, aromatic acyl groups, saturated or unsaturated alkoxy carbonyl groups, sulphonyl imidazolide, carbonyl imidazolide, aliphatic or aromatic amino carbonyl groups, alkyl imidate groups, saturated or unsaturated phosphinoyl, and aliphatic or aromatic sulphonyl groups.

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74. A process comprising:

05  
reacting a mercaptoacetaldehyde with a compound of formula  $R_yOOCCHO$ , wherein  $R_y$  is  $C_{1-12}$  alkyl or  $C_{6-20}$  aryl to obtain a compound of formula (XV)



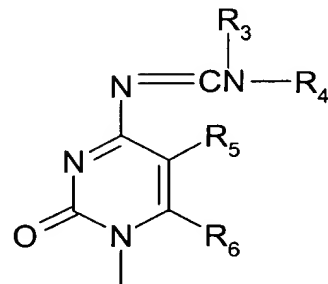
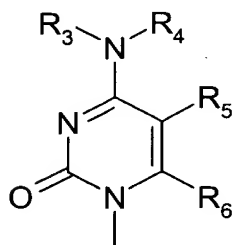
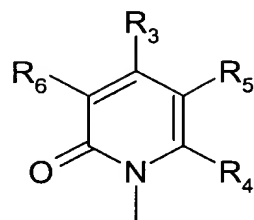
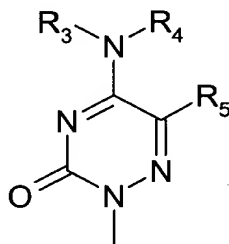
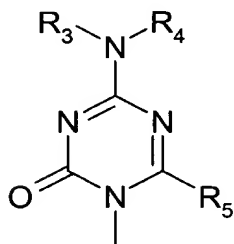
converting the hydroxyl group of the compound of formula (XV) to a leaving group  $L$  to obtain a compound of formula (XVI):

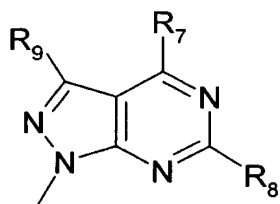
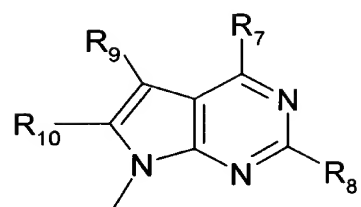
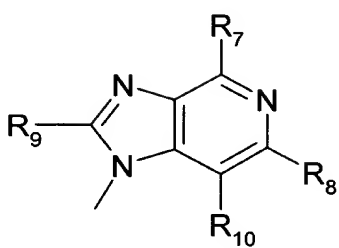
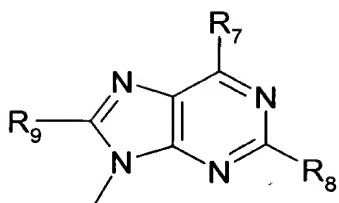
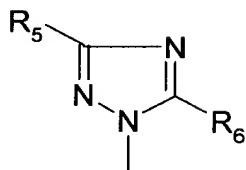
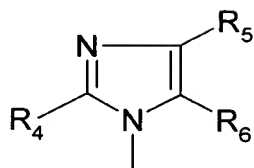
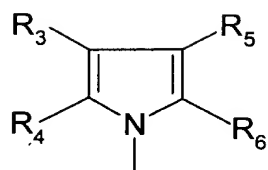
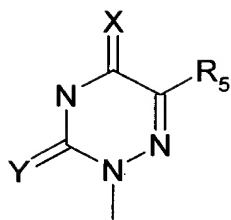
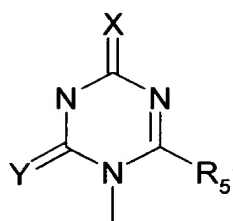
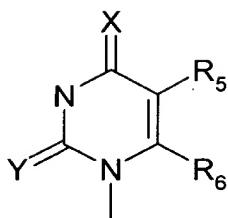

$$\text{R}_y\text{O}_2\text{C}-\text{CH}(\text{Z})-\text{CH}(\text{R}_2)-\text{O}$$

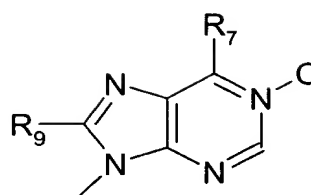
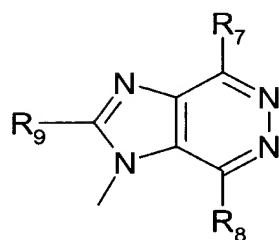
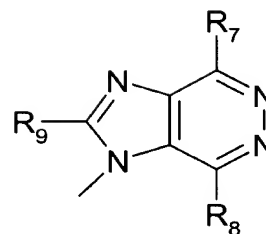
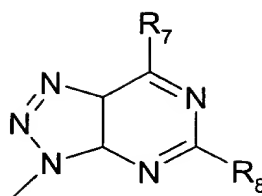
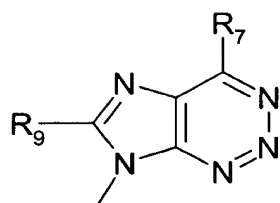
(XVII)

Z is S;

R<sub>2</sub> is selected from the following group:







X is oxygen or sulfur;

Y is oxygen or sulfur;

R<sub>3</sub> and R<sub>4</sub> are independently selected from hydrogen, hydroxyl, amino, C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, and C<sub>1-10</sub> acyl or aracyl;

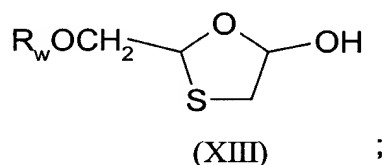
R<sub>5</sub> and R<sub>6</sub> are independently selected hydrogen, halogen, hydroxyl, amino, cyano, carboxy, carbamoyl, alkoxy carbonyl, hydroxymethyl, trifluoromethyl, thioaryl, C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, and C<sub>1-10</sub> acyloxy;

R<sub>7</sub> and R<sub>8</sub> are independently selected from hydrogen, hydroxy, alkoxy, thiol, thioalkyl, amino, halogen, cyano, carboxy, alkoxycarbonyl, carbamoyl, C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, and C<sub>1-10</sub> acyloxy; and

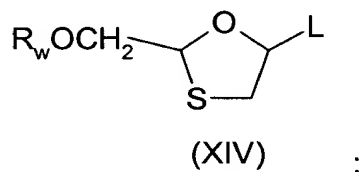
R<sub>9</sub> and R<sub>10</sub> are independently selected from the hydrogen, hydroxy, alkoxy, amino, halogen, azido, C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, and C<sub>1-10</sub> acyloxy.

75. A process comprising:

reacting a mercaptoacetaldehyde with a compound of formula R<sub>w</sub>OCH<sub>2</sub>CHO, under neutral or basic conditions, wherein R<sub>w</sub> is hydrogen or a hydroxyl protecting group to obtain a compound of formula (XIII)

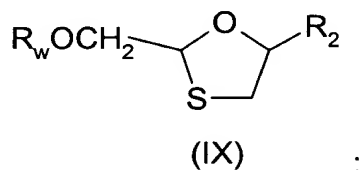


converting the hydroxyl of the compound of formula (XIII) to a leaving group L to obtain a compound of formula (XIV):



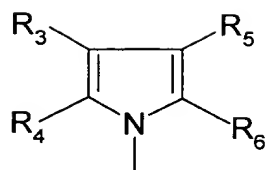
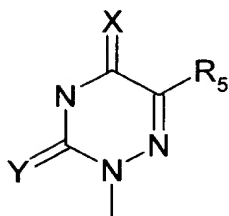
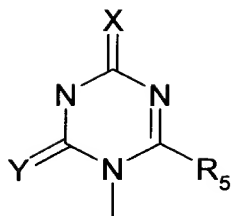
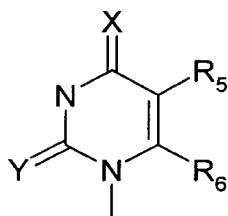
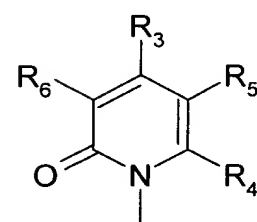
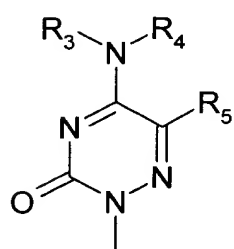
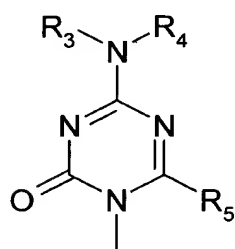
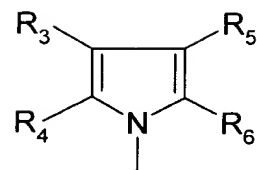
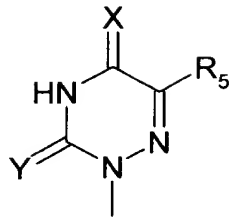
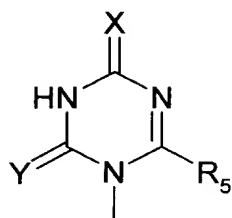
reacting the compound of formula (XIV) with a silylated purine or pyrimidine base or derivative thereof R<sub>2</sub>, in the presence of a Lewis acid, said leaving group is displaced, to produce a compound of formula (IX):

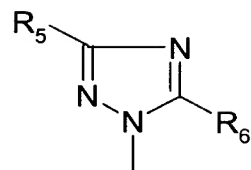
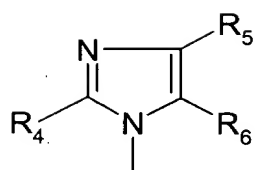
wherein



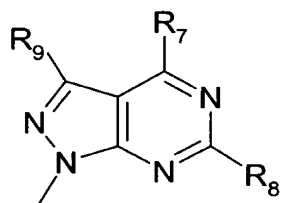
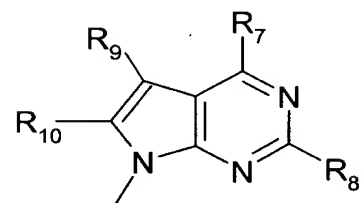
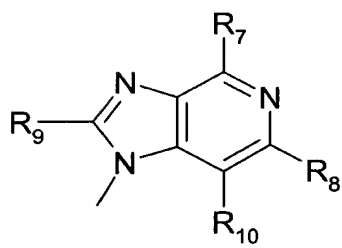
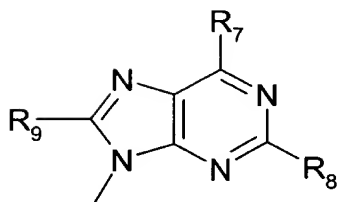
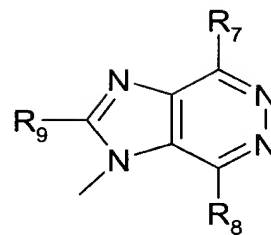
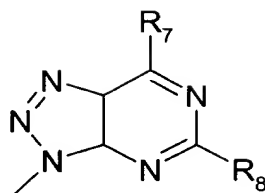
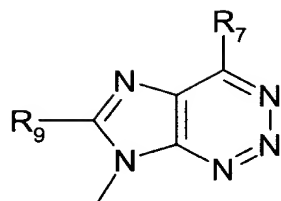
Z is S, and

R<sub>2</sub> is selected from the following group:

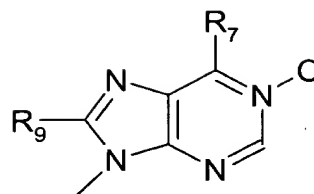
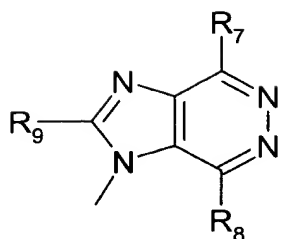




05







DS

X is oxygen or sulfur;

Y is oxygen or sulfur;

R<sub>3</sub> and R<sub>4</sub> are independently selected from hydrogen, hydroxyl, amino, C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, and C<sub>1-10</sub> acyl or aracyl;

R<sub>5</sub> and R<sub>6</sub> are independently selected hydrogen, halogen, hydroxyl, amino, cyano, carboxy, carbamoyl, alkoxycarbonyl, hydroxymethyl, trifluoromethyl, thioaryl, C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, and C<sub>1-10</sub> acyloxy;

R<sub>7</sub> and R<sub>8</sub> are independently selected from hydrogen, hydroxy, alkoxy, thiol, thioalkyl, amino, halogen, cyano, carboxy, alkoxycarbonyl, carbamoyl, C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, and C<sub>1-10</sub> acyloxy; and

R<sub>9</sub> and R<sub>10</sub> are independently selected from the hydrogen, hydroxy, alkoxy, amino, halogen, azido, C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, and C<sub>1-10</sub> acyloxy.--

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